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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/655,113	09/05/2000	Kay-Leong Lim	AMT-2000-001	7374

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EXAMINER
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MAI, NGOCLAN THI

ART UNIT	PAPER NUMBER
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1742

11

DATE MAILED: 12/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/655,113

Applicant(s)

LIM ET AL.

Examiner

Ngoclan T. Mai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4-7,9-12 and 14-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16-21 is/are allowed.
- 6) ☒ Claim(s) 1,2,4-7,9-12,14 and 15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/11/02 has been entered.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Claim Rejections - 35 USC § 103***

3. Claims 1-2, 4-7, 9-12, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barros et al. in view of Wingefeld et al.

Barros disclosed a method of injection molding ceramic or metal parts having an internal cavity comprising forming a fugitive core, injection molding ceramic or metal powder mixed with a binder around the fugitive core to form the molded part, removing the fugitive core from the molded part, and sintering the molded part in a vacuum furnace. Barros also taught the fugitive core could be formed of binder alone and that the fugitive core binder could be different from the binder in the feedstock, see col. 1, lines 59-65. Barros further taught that polyacetal, polymeric or methylcellulose binder

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could be used to form either the core or the molded part, see col. 3, lines 27-29. Barros also disclosed removing the fugitive core formed of a mixture of glass powder and polyacetal by acid gas treating the core at elevated temperature to remove the polyacetal, which is a well known process disclosed by US Pat. No. 5,043,121 to Wingefeld et al, and low pressure extracting the residue of glass powder (see col. 3, lines 3-12). Note when fugitive core formed of only binder is used, there is no glass powder residue. While Barros did not expressively teach removing fugitive core by vaporization or ash-free combustion, the removal of polyacetal by this process is inherently removing the core through vaporization or ash-free combustion because in this process polyacetal binder is depolymerized to form formaldehyde which can easily diffuse out of the molded part, see Wingefeld et al, col. 3, lines 49-60 and there is no ash residue left behind. Note that formaldehyde is a colorless and gaseous compound. Also note that acid gas in a non-aqueous solvent, which reads on the limitation of claims 4, 9 and 14.

While Barros did not specifically teach using a feedstock of a mixture comprising metal and ceramic powders, using feedstock formed of both metal and ceramic powders in the method taught by Barros would have been obvious since Barros did teach that the molded part could be formed from metal or ceramic powder. It would also be obvious to further include lubricant into the mixture since it is well known in powder metallurgy that using additives such as lubricant and binder impart good compactability, flowability, moldability, heat stability and mold releasability to molded parts.

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With regarding to the providing tooling(s) claimed in claims 6 and 11, the process taught by Barros must inherently use the claimed tooling(s) to carry out the process.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2, 5-7, 10-12 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Takeuchi, (US Patent No. 5,851,073).

Takeuchi disclosed a method for making a hollow part such as a ball linear guide comprising preparing a core having at least one outer surface, mounting the core in a mold, injection-molding a pellet of metal powder kneaded with a binder into the spaces between the outer surface of the core and the interior surface of the mold, removing the core and sintering the metal powder in vacuum, see col. 3, lines 43-60. Takeuchi taught that the core was made from any low melting point resin and could be removed by melting and evaporation, see col. 6, lines 20-25.

The difference between Takeuchi and that of the claimed invention is that Takeuchi did not teach using a feedstock, which also includes ceramic powder and lubricant with metal powder and binder. However it is notorious well known in the art that like metal powder, ceramic powder can be formed into part by injection molding and ceramic when added to metal improve hardness. It also well known in the art those additives such as lubricant and binder impart good compactability, flowability,

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moldability, heat stability and mold releasability to molded parts. To include ceramic powder and lubricant in the feed stock comprising metal powder and binder taught by Takeuchi to ease processability and improve hardness to the molded part would have been an obvious expedient.

6. Claims 16-21 are allowed.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kim is cited to show that polyacetal binder can be removed by heating at various temperatures without using acid gas.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoclan T. Mai whose telephone number is (703) 306-4162. The examiner can normally be reached on 7:30-4:00 PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (703) 308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Ngoclan T. Mai  
Primary Examiner  
Art Unit 1742

n.m.  
December 17, 2002